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(54) **SELF PRESERVED AQUEOUS
PHARMACEUTICAL COMPOSITIONS**

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A01N 59/14 (2006.01)

(52) **U.S. Cl.** **424/78.04**; 424/405; 424/641;
424/657; 424/659; 424/660; 514/912

(58) **Field of Classification Search** None
See application file for complete search history.

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(57) **ABSTRACT**

The present invention is directed to the provision of multi-
dose, self-preserved ophthalmic compositions. The composi-
tions possess sufficient antimicrobial activity to satisfy USP
preservative efficacy requirements, as well as similar preser-
vative standards (e.g., EP and JP), without requiring the pres-
ence of conventional anti-microbial preservative agents, such
as benzalkonium chloride. The compositions are effectively
preserved by a balanced ionic buffer system containing zinc
ions at a concentration of 0.04 to 0.9 mM, preferably 0.04 to
0.4 mM. One aspect of the balanced buffer system is limita-
tion of the amount of buffering anions present to a concen-
tration of 15 mM or less, preferably 5 mM or less. In a
preferred embodiment, the compositions also contain borat
or, most preferably, one or more borate/polyol complexes.
The use of propylene glycol as the polyol in such complexes
is strongly preferred. Limiting the amount of divalent metals
other than zinc and the amount of ionized salts present has
also been determined to be important to maximize the anti-
microbial activity of the balanced buffer systems.

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FIG. 1

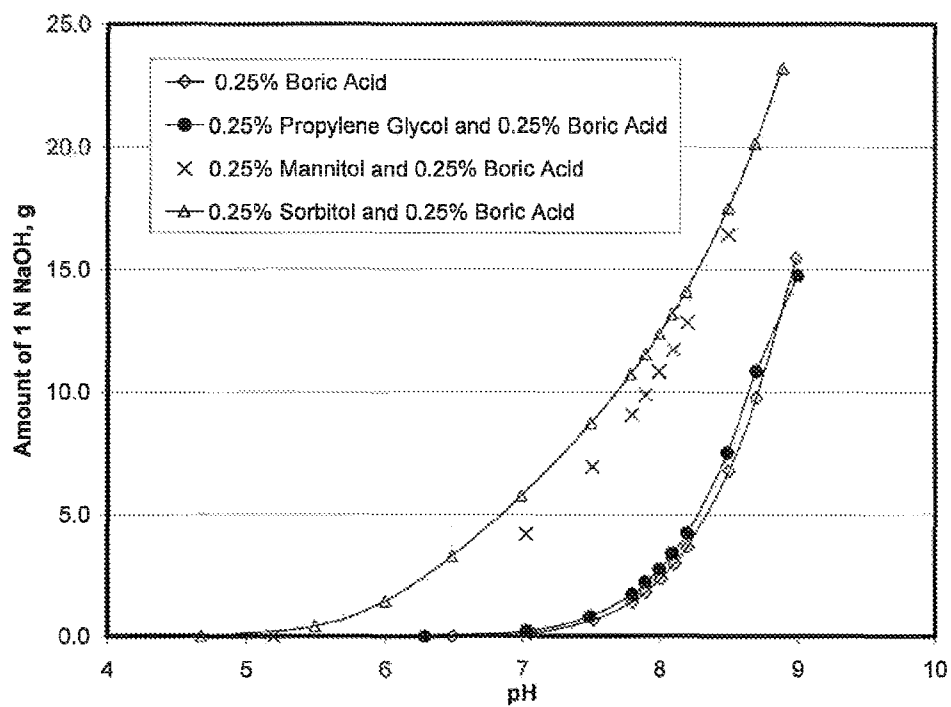


FIG. 2

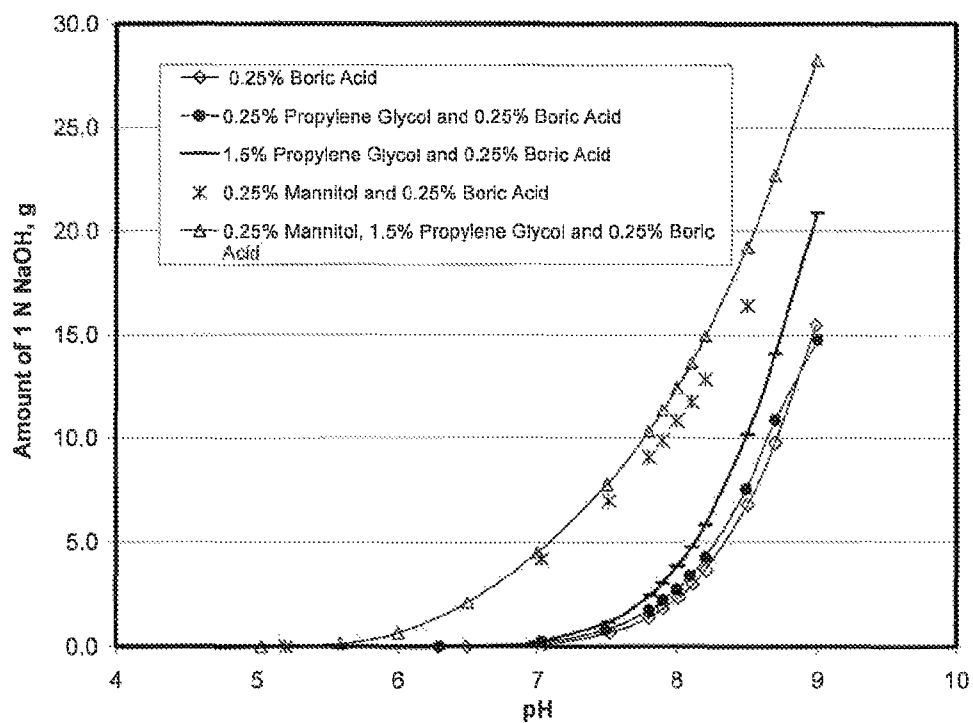
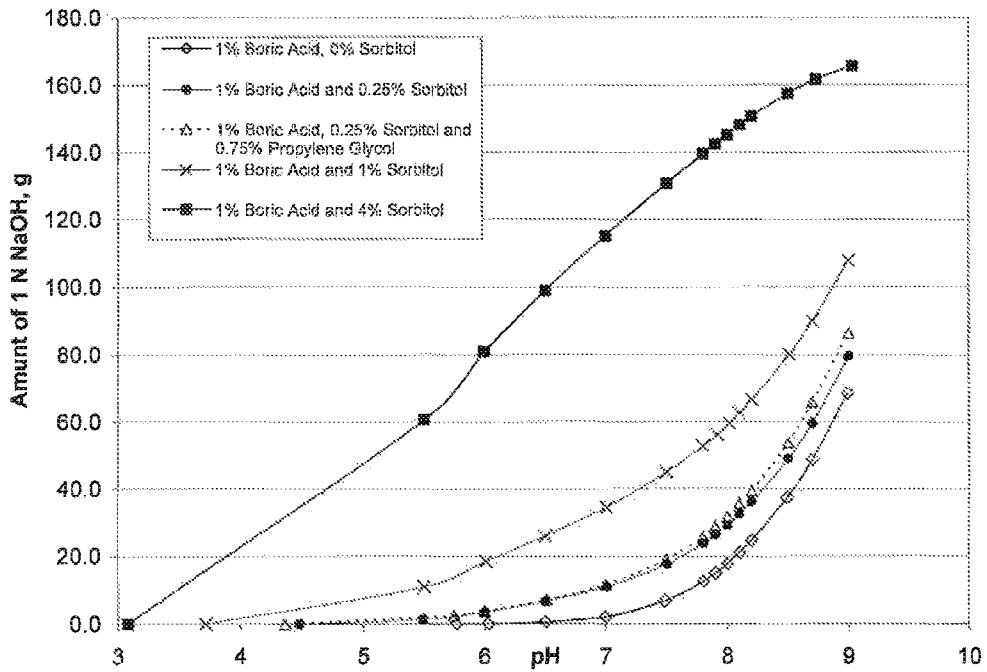


FIG. 3



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